Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE – SEMESTER- VII EXAMINATION-SUMMER 2023

Subject Code: 3170906 Date: 26/06/2023

Subject Name: Advanced Power Electronics

Time: 10:30 AM TO 01:00 PM Total Marks: 70

Instructions:

1. **Attempt all questions.**
2. **Make suitable assumptions wherever necessary.**
3. **Figures to the right indicate full marks.**
4. **Simple and non-programmable scientific calculators are allowed.**

			Marks
Q.1	**(a)**	State important advantages, disadvantages and application of SMPS	**03**
	(b)	Explain Flyback converter.	**04**
	(c)	Discuss operation of CUK converter.Derive the relation between duty ratio and i/p voltage.	**07**
Q.2	**(a)**	Classify the Resonant converter.	**03**
	(b)	What is the need of Resonant Converter? Compare Series Loaded Resonant (SLR) converter with Parallel Loaded Resonant (PLR) converter.	**04**
	(c)	Explain the operation of Zero Voltage Switching resonant converter with circuit diagram, waveform and required equation.	**07**
		OR	
	(c)	Explain operation of Cascaded H-bridge multilevel inverter.	**07**
Q.3	**(a)**	Explain the concept and need of Multi Level inverter.	**03**
	(b)	Explain difference between multi pulse converter and multilevel converter with suitable diagram.	**04**
	(c)	Draw the transformer connections for 18 pulse converter. Explain Y-Z2 transformer connection used for multipulse converter.	**07**
		OR	
Q.3	**(a)**	State advantages and disadvantages of Multi-pulse converter.	**03**
	(b)	Compare the three topologies of multilevel inverter	**04**
	(c)	Draw circuit diagram and wave forms of five level diode clamped inverter. Explain its working.	**07**
Q.4	**(a)**	Explain different type of HVDC link.	**03**
	(b)	Give Comparison of HVAC and HVDC transmission.	**04**
	(c)	Draw and explain bipolar HVDC power transmission system based on 12 pulse converters for each pole.	**07**
		OR	
Q.4	**(a)**	What is phase angle compensation in transmission line?	**03**
	(b)	Draw the typical HVDC transmission scheme and explain the equipments required for HVDC system.	**04**
	(c)	Discuss importance of reactive power compensation. Discuss phase-shifting transformer with necessary diagram in brief.	**07**
Q.5	**(a)**	Explain the advantages and limitations of static synchronous series compensator (SSSC).	**03**
	(b)	Define FACTS. Give detail classification of FACTS controller.	**04**

	(c)	Explain the working principle of Thyristorised controlled Reactor (TCR) with neat sketch.	**07**

OR

Q.5	**(a)**	Compare SVC and STATCOM.	**03**
	(b)	What is Synchronous Condenser?	**04**
	(c)	Explain operating principle of Unified Power Flow Controller (UPFC).	**07**

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